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plateaux flanking the mountains; (3) The rivers carrying the waste of the land into the ocean; (4) The lakes, temporarily interrupting the transportation of waste to the ocean and retarding the action of the rivers; (5) The shore-line where the land dips under the sea.

—Professor von Cienkowsky, the well-known student of the lower animals, died October 7th, 1887, in Leipzig. He was born October 13th, 1822, in Warsaw, and at various times held a professor's chair in Jaroslaw, St. Petersburg, and Odessa. At the time of his death he was a member of the faculty of Charcow.

—RECENT DEATHS.—Robert Francis Logan, an entomologist, at Spylaw, near Edinburg, July 28, 1887.——Pierre Millière, entomologist, aged seventy-four, at Cannes, May 29, 1887.

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA.—May 24, 1887.—Dr. Chapman presented " Notes on the Anatomy of *Echidna hystrix*.

May 31, 1887.—Dr. Leidy described *Asplanchna ebbesbornii*, a rotifer, originally described by Hudson from specimens obtained in Wiltshire, England. Dr. Leidy's specimens were from a duck-pond, sewage fed, below this city. The animal is viviparous and swarms in the pond in company with Daphnia. It has a single eye and a pair of lateral conical horns.

June 14, 1887.—Prof. H. F. Osborn presented a paper upon the "Structure and Classification of Mesozoic Mammalia, and C. H. Eigenmann "Notes on the Specific Names of Certain North American Fishes."

June 21, 1887.—Mr. Thos. Meehan stated that Chionanthus, though usually described as having perfect flowers, is on the borders of diœcism, having impotent anthers with a perfect pistil on one plant, and polliniferous anthers and an imperfect pistil on another. This is the rule. The male plants are the more abundant. The male flowers seem only to be visited by the pollen-eating Thrips, and are therefore anemophilous.

August 9, 1887.—A letter from Miss A. Fielde, Swatow, China, describing an aquatic larva and its case, was read. The animal is stated to be near Hydropsyche.

August 16, 1887.—Prof. J. A. Ryder presented a paper upon the "Homologies and Early History of the Limbs of Vertebrates."

AMERICAN SOCIETY OF NATURALISTS.—The annual meeting (1887) was held at New Haven, Conn., in the Lecture-Room of the

Peabody Museum, on December 27th, 28th and 29th. The following papers were read:—

Tuesday—Biology.—(1) The President's address on "The Inconstant in Biology," by Professor Harrison Allen, M. D.; (2) "Perfected Wools for Detection of Color," by Charles A. Oliver, M. D.; (3) "Injection of the Thoracic Duct," by Professor S. H. Gage; (4) Exhibition of newly-devised Physiological Apparatus, by Professor H. Newell Martin; (5) "Method of Life-size Model-making of the Larger Animals," by Mr. James H. Emerton; (6) "A Lecture-room Illustration of Variation under Domestication and in Nature," by Samuel F. Clarke; (7) "Methods of Cutting Serial Brain and Spinal Cord Sections," by Professor Henry F. Osborn; (8) "A New Automatic Microtome," by Dr. Charles S. Minot; (9) "On the Preparation of Serial Sections," by Dr. Charles S. Minot.

Wednesday—"Science-Teaching in the Schools."—Papers were read by Professor Alexander Winchell, of Ann Arbor; Professor George Macloskie, of Princeton; Professor William North Rice, of Wesleyan; Professor Ramsay Wright, of Toronto.

Thursday—Geology.—(1) "The Volcano of Kilauea," by Professor James D. Dana; (2) A Palæontological paper, by Professor William B. Scott (not read); (3) "A Simple Method of Measuring the Thickness of Inclined Strata," by Mr. C. D. Walcott; (4) "Improved Machinery and Appliances for Cutting Sections of Rocks and Fossils in Any Desired Planes," by Professor William B. Dwight; (5) "The Educational Value of Micropetrography," by Professor George H. Williams; (6) "Instruction in Mineralogy and Structural Geology in the Massachusetts Institute of Technology," by Professor W. O. Crosby; (7) "Museum-Cases in Europe," by Professor Edward S. Morse.

A resolution appropriating sixty dollars for the purchase of ten copies of Volume I. of the *American Journal of Morphology* was adopted.

Also, a resolution identical with that which passed the American Philosophical Society and six other scientific societies, requesting Congress to remove the duty on scientific books and apparatus.

The Society adjourned, to meet at the same time in 1888 at the Johns Hopkins University, in Baltimore, Md.

President, HARRISON ALLEN; Vice Presidents, G. L. GOODALE, H. S. WILLIAMS, H. F. OSBORN; Secretary, S. F. CLARKE; Treasurer, W. T. SEDGWICK; Executive Committee from Society at large, RICHARD RATHBUN and GEORGE H. WILLIAMS.

BIOLOGICAL SOCIETY OF WASHINGTON.—October 22, 1887.—Communications: L. O. Howard, An Ant-decapitating Parasite; Geo. Vasey, Notes on Western Grasses; F. A. Lucas, The Bird Rocks in 1887; A. A. Crozier, Some Botanical Terms; C. Hart Merriam, The Fauna of the Great Smoky Mountains.

November 5.—Communications: J. B. Smith, Some Geographical Variations of Insects; T. H. Bean, The young Forms of Some of our Food-fishes, with illustrations; N. P. Scudder, The Period of Gestation in the Common Mouse; H. E. Van Deman, The *Diospyros kaki* in North America; T. N. Gill, Characteristics of the Notalian Fish Faunas.

November 19.—Communications: Marshall McDonald, Explanation of Past Failures in the Culture of the Salmonidæ; Walter B. Barrows, Freshet Notes on the Rio Uruguay; T. H. Bean, Description of a new species of *Thyrsites* from the New England Fishing Banks; T. W. True, Recent Works upon Whales; F. A. Lucas, An Alcine Cemetery.

December 3, 1887.—The following communications were read: Mr. Charles Hallock, The Great Roseau Swamp; Dr. C. A. White, On the Rapid Disappearance of the Cast Antlers of the *Cervidæ;* Dr. Theobald Smith, Peptonizing Ferments Among Bacteria; Mr. C. D. Walcott, A Fossil *Lingula* Preserving the Cast of the Peduncle; Dr. Theo. Gill, The Phylogeny of the Cetacea.

December 17, 1887.—The following communications were read: Mr. C. L. Hopkins, Notes Relative to the Sense of Smell in Buzzards; Dr. Cooper Curtice, The Timber Line of Pike's Peak; Mr. Chas. D. Walcott, Exhibition of, and Remarks, on a Section of a Fossil *Endoceras,* over Eight Feet in Length; Dr. Leonhard Stejneger. On the Extinction of the Great Northern Sea Cow; Dr. C. Hart Merriam, Description of a New Mouse from the Great Plains.

Boston Society of Natural History, December 7th, 1887.—Professor N. S. Shaler read a paper on the origin of the divisions between the layers of stratified rocks. Professor G. F. Wright spoke of the glaciation of the Pacific Coast. Professor G. L. Goodale exhibited some new glass models recently obtained by Harvard University which illustrate the structure and morphology of plants.

The American Committee of the International Congress of Geologists.—This Committee met in New Haven, after the adjournment of the Society of Naturalists, on December 29th and 30th. Present—Dr. T. Sterry Hunt, Chairman; Dr. P. Frazier, Secretary, and Messrs. Cook, Cope, Dana, Hitchcock, Newberry, Powell, Stevenson, Winchell and Williams. The reports of the reporters of the different sub-committees were read and were ordered to be printed in galley form for further emendation, where thought necessary. All the reports were ordered to be completed by April 1st, 1888. A resolution inviting the Congress to meet in the United States in 1891 was adopted. The proposition to enlarge the Committee by the addition to it of additional members of the United States Geological Survey was not agreed to

INDIANA ACADEMY OF SCIENCE.—The third annual meeting of the Indiana Academy of Science was held at the Court House, Indianapolis, December 28 and 29, 1887, with Dr. John M. Coulter in the chair. The following papers were read:—" The East-West Diameter of the Silurian Island about Cincinnati," by Professor D. W. Dennis: Professor Dennis alluded to the fact that at Richmond, Indiana, there was a thin bed of rock composed of broken shells of lower diluvium age, in its character much like coquina and indicating an ancient shore line. Two similar deposits have been found in Adams and Highland counties, Ohio, and these give the means of measuring the east to west diameter of the Silurian island which existed when this rock was formed. In " Erosion in Indiana," J. T. Scovell maintained that at least seven hundred feet of erosion had taken place over the whole state of Indiana. He alluded to the ancient river channels corresponding in general to the present courses but wider and deeper, and stated that, of the drift material in the state, on the average five feet came from the state and fifty was of extra-state origin. A " Geological Section of Johnson County, Indiana," by D. A. Owen, was an account of the strata passed through in boring various wells. D. W. Dennis stated that the " Transition of *Orthis occidentalis* unto *Orthis sinuatu*" was accomplished in 300 feet at Richmond, Indiana, illustrating his point by numerous specimens. " Notes on Some Fossil Bones found in Indiana," by O. P. Hay, was the announcement of the identification of the genus Tapirus in some bones found in a sink-hole in Monroe county.

In zoology the papers were more numerous, but many of them consisted of the records of additions to the fauna of the state. Such was B. W. Evermann's " Fishes of Carroll County," in which five species new to the state were enumerated, the most noticeable being *Notropis arga* Cope, " Notes on Some Southern Indiana Fishes," by O. P. Jenkins, and " Some rare Indiana Birds," by Amos W. Butler, were of a character expressed by their titles. B. W. Evermann noticed " the Occurrence of the Star-nosed Mole in Indiana; A. W. Butler, in his " Notes on Indiana Reptiles and Amphibians," added *Plethodon cinereus*, *Hyla squirilla*, and two new species of Entænia to be described by Professor Cope to the fauna of the state. The "Additions to the List of Indiana Reptiles," by O. P. Hay, were *Cinosternum pennsylvanicum* *Tropidonotus rigidus*, and *Cnemidophorus sexlineatus* all on the authority of Robert Ridgway.

In 1869 Dr. Günther enumerated 193 species of fish occurring on one side or the other of the Isthmus of Panama, of which about one-third were regarded as common to both the Alantic and Pacific sides. D. S. Jordan, in his paper, "The Isthmus of Panama as a Barrier to Marine Fauna," stated that now there were known 1370 species from the same region of which but five per cent. were common to the Caribbean and the Pacific shores. With these data the recent connection of the two seas is not so probable as Dr. Günther's fish figures would make it. In a paper on "Blind Fishes and National Selection," D. S. Jordan replied to the statement in some religious paper that "evolution would find it exceedingly difficult to account for these forms." In "The Origin of Genera," the same gentleman gave an outline of the view of Professor Cope on this subject and mentioned some of the difficulties which were presented by fishes, at the same time indicating the great aid which systematic zoology had received from the same theory.

"The Origin of Arthropods," by J. S. Kingsley, was a résumé of recent views on the origin and lines of descent of the various groups of arthropods. O. P. Hay, in his "Observations on Amphiama," gave some interesting facts regarding this batrachian. In Arkansas he found an Amphiama incubating her eggs underneath a log. She was coiled around her eggs and was very sluggish at first. Later she was quite cross and irritable, uttering a shrill sound like a whistle. The eggs, of which there are about a hundred and fifty, form long stings, the gelatinous envelope shrinking between the eggs so that the whole sting resembles a sting of beads. The young which were in an advanced stage of development were about one and three fourths inches in length with well-developed gills, each bronchia consisting of a main stalk with three feathered branches. The eggs themselves were about the size of a pea.

C. W. Hargitt had two papers: "Curiosities of egg formation," and "Notes on *Scaphiopus holbrookii.*" The first detailed some cases of teratology in the eggs of hens and turkeys; the second an appearance of the spade-foot toad at Marthas Vineyard during a heavy rain during the past summer. A. W. Butler made some "Suggestions concerning a law for the Protection of Birds," stating that the present law would not stand, and that it is impossible to secure convictions under it. A committee was appointed to urge the passage of a suitable law embodying the provisions of the New York and Massachusetts statutes upon the 'next legislature. Maurice Thompson's "Secondary functions of the Hyoid corma in Picus and Colaptes" showed a lack of morphological and physiological knowledge.

The address of the president, John M. Coulter, was delivered Wednesday evening, and with "Evolution in the Vegetable Kingdom," tracing the origin of the sexual element in plants, and the gradual increase of the asexual over the sexual generations. Besides this there were six papers read on botanical subjects. Miss Lillie J. Martin spoke of the "Value of Organized Work in Plant Chemistry;" J. N. Rose mentioned the "Characters in Umbelliferæ," which he found of most value in the classification of this group of plants while working them up in connection with Professor Coulter for the Synoptical Flora. The most valuable characters were found in the fruit. Stanley Coulter spoke of the "Histology of the leaf of *Taxodium distidium.*" He found the cell walls difficult to study on account of their thinness and the large cell spaces. He described the strengthening cell system and the resin-ducts. The fibro vascular bundle in the centre of the leaf showed traces of its formation by the coalescence from two primitive bundles; whether these remained distinct at the tip the author could not say. There are eight stomata in each leaf, six above and two below.

John M. Coulter described the peculiar structure of the "Stornata of *Tillandia usneoides*." The scales which give the Spanish moss its pubiscent appearance are to be regarded as leaves since each bears a stoma. Surrounding each stoma is a trichoner structure, in the centre of which are four sensitive cells. Below these comes the true stoma with its two sensitive guard cells. Experiments with the plants showed that this peculiar structure was to be explained by the epiphytic habits of Tillandia and the trichonu structure must be regarded as a reservoir of moisture. Walter H. Evans, in an account of the "Lichens of Indiana," gave an account of the habits and structure of Lichens and the methods of collecting these plants. He stated that he had already recognized seventy-six species of Lichens in the state, distributed among twenty-eight genera.

J. C. Arthur detailed his investigations on the "Life History of the Plum-leaf Fungus." He found that the summer spores cannot withstand the winter but that soon after the leaves fall to the ground there is a new formation of minute winter spores, the subsequent history of which he had not found out but which he was inclined to regard as male sex spores. No other spores were formed in winter but in spring the fungus took on a new development with the formation of ascospores which ripened in June. From these the leaves were infected and a new growth of the fungus took place.

The last paper was "Man an Evolution—Biological proofs," by T. B. Ridding. The author accepted the principle of evolution but claimed that there must be successive additions of Divine power in order to account for the existing fauna and flora and for the appearance of man.

Committees were appointed looking towards the purchase of scientific works by the State Library and to invite the American Association for the Advancement of Science to hold a meeting at Indianapolis in 1889. It was voted to hold the spring meeting of the Academy May 9, 1888, at Wyandotte Cave. The following are the officers for the coming year. President, J. P. D. John of Greencastle; Vice-Presidents, John C. Brunner, of Bloomington, T. C. Mendenhall, of Terre Haute, O. P. Hay, of Irvington; Secretary, Amos W. Butler, of Brookville; Treasurer, O. P. Jenkins, of Greencastle. It was voted that the past presidents of the Academy be added to the executive committee.